



## ELECTRO-CONDUCTIVE ROLL AND IMAGE-FORMING APPARATUS USING THE SAME

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority under 35 USC 119 from Japanese Patent Application Nos. 2003-75780 and 2003-385996, the disclosures of which are incorporated by reference herein.

### BACKGROUND OF THE INVENTION

#### Field of the Invention

[0002] The present invention relates to an electro-conductive roll such as a charging roll, a transfer roll, or a cleaning roll used in an electrophotographic process or an electrostatic recording process in an image forming apparatus, such as an electrophotographic copying machine or a printer; and an image forming apparatus using the electro-conductive roll.

#### Description of the Related Art

[0003] Recently in image forming apparatuses using electrophotographic systems, charging rolls have been widely used as members for uniformly charging the surface of a body to be charged, such as a photoreceptor. The charging roll, which has voltage applied thereto, comes in contact with the photoreceptor, and discharges electricity at a micro gap between the charging roll and the photoreceptor, thereby causing the surface of the photosensitive material to be charged. The resistance and shape of the above-described charging roll are strictly controlled so as to allow uniform charging of the photoreceptor.

[0004] In image forming apparatuses for electrophotography using charging rolls, foreign substances such as residual transfer toner, carrier, and paper dust, which adhere to the photoreceptor surface, come into a nip portion between the charging roll and the photoreceptor. Therefore, the foreign substances adhere to the surface of the charging roll and contaminate the charging roll. If foreign substances adhere to the surface of the charging roll, the portion of the charging roll with the foreign substances adhering thereto has a high resistance, thereby causing poor charging of the photoreceptor or abnormal discharging at the portion of the charging roll having the foreign substances. As a result, image defects such as white spots or color spots form in an image that has been developed and transferred. A charging roll that is continuously contaminated with foreign substances adhering thereto over a long period of time causes uneven resistance of the roll as a whole. Accordingly, irregular